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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/021,748	10/29/2001	Hannu J. Mikkola	297-010461-US(PAR)	6246

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EXAMINER	
WILLIAMS, LAWRENCE B	

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 03/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/021,748	MIKKOLA ET AL.	
	Examiner	Art Unit	
	Lawrence B Williams	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 October 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) *1-9* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because:

a.) Applicant uses reference numerals from multiple figures. Examiner suggests applicant use reference numerals from one figure only.

b.) Examiner suggests applicant delete the phrase "Fig. 4" at the end of the abstract. Correction is required. See MPEP § 608.01(b).

2. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 10-11, and 15-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Wong et al. (W/O 97/14235).

(1) With regard to claim 10, Wong et al. discloses in Fig(s). 1 and 10, a method for transmitting frames of digital information over a wireless communication connection between a transmitter and a receiver, comprising the steps of: - in the transmitter, convolutionally encoding

and puncturing a certain sequence of bits within each frame of digital information before transmitting the frame over a wireless communication connection (pg. 3, lines 17-24), and - in the receiver, decoding (119) and depuncturing (115) the sequence of bits within each frame of digital information that was convolutionally encoded and punctured, after receiving the frame over a wireless communication connection; wherein: - said step performed in the transmitter comprises the substep of rearranging the sequence of bits within each frame of digital information that is to be convolutionally encoded and punctured (4), before convolutionally encoding and puncturing it, into an order that has been found to produce, during the course of convolutionally encoding with a certain convolutional code and puncturing with a certain puncturing pattern, a convolutionally encoded and punctured sequence where the statistical probability of transmission errors exhibits a predefined behaviour (pg. 4, lines 4-31) and - said step performed in the receiver comprises the substep of inversely rearranging the sequence of bits within each frame of digital information that was so rearranged in the transmitter (118) so that the effect of said rearranging in the transmitter on the mutual order of the bits of the sequence is cancelled after decoding and depuncturing the sequence of bits.

(2) With regard to claim 11, claim 11 inherits all limitations of claim 10 above. Furthermore, Wong et al. also discloses in Fig. 11, wherein the rearranging of the sequence of bits within each frame of digital information is made into an order that has been found to produce, during the course of convolutionally encoding with a certain convolutional code and puncturing with a certain puncturing pattern, a convolutionally encoded and punctured sequence where the statistical probability of transmission errors increases essentially monotonously

towards the end of said convolutionally encoded and punctured sequence (pg. 14, line 10-pg. 15, line 25).

(3) With regard to claim 15, claim 15 inherits all limitations of claim 10 above.

(4) With regard to claim 16, claim 16 inherits all limitations of claim 15 above. Furthermore, Wong et al. also discloses in Fig. 11, wherein the rearranging of the sequence of bits within each frame of digital information is made into an order that has been found to produce, during the course of convolutionally encoding with a certain convolutional code and puncturing with a certain puncturing pattern, a convolutionally encoded and punctured sequence where the statistical probability of transmission errors increases essentially monotonously towards the end of said convolutionally encoded and punctured sequence (pg. 4, line 4 - line 31).

(5) With regard to claim 17, Wong et al. discloses in Fig(s). 1 and 10, a method for generating rearranging and inverse rearranging tables for the purpose of optimizing the probability distribution of transmission errors in transmitting frames of digital information over a wireless communication connection between a transmitter and a receiver, comprising the steps of: - simulating the propagation of a number of frames of digital information through an arrangement of a transmitter, an error-inducing channel and a receiver so that in the transmitter a certain sequence of bits within each frame of digital information is convolutionally encoded and punctured before transmitting the frame over a wireless communication connection and in the receiver the sequence of bits within each frame of digital information that was convolutionally encoded and punctured is decoded and depunctured after receiving the frame over a wireless communication connection, - observing and storing the statistical probability of transmission errors per bit position in the convolutionally encoded and punctured sequence that is produced in

the transmitter, - rearranging the bit positions within said certain sequence of bits within each frame of digital information so that the importance to a certain subjective signal quality of each bit position comes to inversely correspond to the observed and stored statistical probability of transmission errors per that bit position and - storing the correspondence between the original bit positions and the rearranged bit positions as a rearranging table and the correspondence between the rearranged bit positions and the original bit positions as an inverse rearranging table (pg. 1, lines 6 - pg. 2, line 25; pg. 15).

(6) With regard to claim 18, Wong et al. discloses in Fig(s). 1 and 10 a transmitter for processing frames of digital information before transmitting them over a wireless communication connection to a receiver, comprising: - convolutional encoding (6) and puncturing means (7) for convolutionally encoding and puncturing a certain sequence of bits within each frame of digital information before transmitting the frame over a wireless communication connection, and rearranging means (4) for rearranging the sequence of bits within each frame of digital information that is to be convolutionally encoded and punctured, before convolutionally encoding and puncturing it, into an order that has been found to produce, during the course of convolutionally encoding with a certain convolutional code and puncturing with a certain puncturing pattern, a convolutionally encoded and punctured sequence where the statistical probability of transmission errors exhibits a predefined behaviour (pg. 4, lines 4-31).

(7) With regard to claim 19, claim 19 inherits all limitations of claim 18 above. Furthermore, Wong et al. also discloses wherein the rearranging means is made to rearrange the sequence of bits within each frame of digital information that is to be convolutionally encoded and punctured, before convolutionally encoding and puncturing it, into an order that has been found to produce,

during the course of convolutionally encoding with a certain convolutional code and puncturing with a certain puncturing pattern, a convolutionally encoded and punctured sequence where the statistical probability of transmission errors increases essentially monotonously towards the end of said convolutionally encoded and punctured sequence (pg. 4, line 4 - line 31).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong et al. (W/O 97/14235) as applied to claim 10 above, and further in view of Applicant's admitted Prior Art.

(1) With regard to claim 12, claim 12 inherits all limitations of claim 10 above. As noted above, Wong et al. teaches all limitations of claim 10. Wong et al. does not however explicitly teach the method comprising the steps of: - in the transmitter, dividing the digital information belonging to each frame into least two classes, **which only the bits belonging to one class** are **subjected to said rearranging** before convolutionally encoding and puncturing and in the receiver, combining the digital information belonging to each frame from at least two classes, **which only the bits belonging to one class subjected to said inverse rearranging** after decoding and depuncturing.

However, Applicant's Admitted Prior Art in Fig(s). 1 and 2, discloses in the transmitter,

dividing the digital information belonging to each frame into least two classes, which only the bits belonging to one class are subjected to said rearranging before convolutionally encoding and puncturing and - in the receiver, combining the digital information belonging to each frame from at least two classes, which only the bits belonging to one class subjected to said inverse rearranging after decoding and depuncturing (pg. 2, line 14 - pg. 2, line 13).

It would have been obvious to one skilled in the art at the time of invention to combine the teachings of Wong et al with Applicant's Admitted Prior Art as a method of obtaining a reliable bit error ratio where decoded data sequences contain errors.

(2) With regard to claim 13, claim 13 inherits all limitations of claim Applicant's Admitted Prior Art also discloses in Fig(s) 1 and 2, the method comprising the steps of; "- in the transmitter, calculating checksum over the bits belonging to one class that is not subjected to said rearranging before convolutionally encoding and puncturing, and adding said checksum into the frame digital information to be transmitted to the receiver, and the receiver, recalculating a checksum over the belonging to said one class that is not subjected said rearranging after decoding and depuncturing, and comparing the recalculated checksum a checksum received within the frame of digital information received from the transmitter order to find out, whether transmission errors occurred among the bits over which the checksum was calculated (pg. 2, line 10 - pg. 2, line 13).

(3) With regard to claim 14, claim 14 inherits all limitations of claim 12, above. Furthermore, Applicant's Admitted Prior Art also teaches the method comprising the steps in the transmitter, producing in said dividing step certain predefined class of bits and inserting the bits belonging to this predefined class into the frame digital information to be transmitted to

the receiver without subjecting them either rearranging, convolutional encoding or puncturing and - in the receiver, combining the digital information belonging to each frame also from bits that are not subjected either decoding, depuncturing inverse rearranging (pg. 2, line 10 - pg. 2, line 13).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.) Liu discloses in US Patent 5,867,538 Computational Simplified Detection of Digitally Modulated Radio Signals Providing A Detection of Probability For Each Symbol.

b.) Mobin et al. discloses in US Patent 6,522,691 B1 adaptive Frequency Correction In A Wireless Communications System, Such as for GSM and IS54.

c.) Mikkola et al discloses in US Patent 6,791,966 B1 Signal Coding.

d.) Jarvinen et al. discloses in US 2002/0035713 A1 Information Coding Method and Devices Utilizing Error Correction and Error Detection.

e.) Jarvinen et al. discloses in US Patent 6,470,470 B2 Information Coding Method and Devices Utilizing Error Correction and Error Detection.**

f.) Kalliojarvi discloses in US Patent 6,438,723 B1 Method And Arrangement For The Reliable Transmission of Packet Data.

g.) Maeda discloses in US Patent 6,230,124 B1 Coding Method and Apparatus, and Decoding Method and Apparatus.**

h.) Kondo et al. Discloses in US Patent 6,298,085 B1 Source Encoding Using Shuffling of Data To Provide Robust Error Recovery In a Burst Error-Environment.

i.) Yano et al. Discloses in US 2002/0090022 A1 Spread Spectrum Communication Device and Spread Spectrum communication Method.

j.) Berger et al. Discloses in US 2003/0221156 A1 Method and Apparatus for Concatenated Punctured Encoding and Decoding of a Communications Signals.

k.) Kwon et al. Discloses in US 2003/0106006 A1 apparatus and Method for Transmitting and Receiving Data on Packet Data Control Channel.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams

lbw
March 10, 2005

AMANDA T. LE
PRIMARY EXAMINER